EXECUTIVE SUMMARY OF ENERGY SAVING OPPORTUNITY SURVEY (ESOS) FOR FT. MCCLELLAN ARMY POST ANNISTON, ALABAMA

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U.S. ARMY CORPS OF ENGINEERS
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EXECUTIVE SUMMARY INDEX

I. INTRODUCTION

Ft. McClellan, located northeast of Anniston, Alabama, is utilized as both a basic training facility and schools for Military Police and the Chemical Command. The base, covering approximately forty-five hundred (4,500) acres, sets in gently rolling terrain and experiences mild winters and long warm summers.

In 1980 through 1982 a Basewide Energy Systems Plan (BESP) was developed under the direction of the Corps of Engineers at Ft. McClellan to assist the installation in meeting the requirements of the Army Facilities Energy Plan and the ten (10) year Energy Use Reduction Goal. Some of the energy saving projects recommended by the BESP have been implemented. In FY 1977, the total base energy consumption was 1,105,221 MBtu (Million British thermal units). By FY 1987, this had been reduced to 870,900 MBtu, a reduction of twenty-one percent (21%). This resulted in a cost avoidance for FY 1987 over base year FY 1977 of $2,960,986, or a thirty-two percent (32%) reduction.

The achievement of these energy reductions had occurred by implementing a high priority action-oriented task plan utilizing short term and long term facility retrofit projects as well as people-oriented programs.

It was in the continuing effort of this program that Energy Management Consultants, Inc. of Birmingham, Alabama was selected in the fall of 1987 to conduct an ESOS of one hundred twenty-five (125) buildings and the five hundred seventy-one (571) housing units.

The task of conducting an effective ESOS study at the installation would be a difficult one due to the effective conservation efforts already implemented and the relatively low cost of fuel. However, the Scope of Work developed by the Mobile District U.S. Army Corps of Engineers, gave the following charge:

1. Review for general information the previously completed Energy Engineering Analysis Program (EEAP) study and any other energy studies which have been performed at the installation.

2. Reevaluate selected ECO's and projects previously investigated in the EEAP study which have not been implemented. These projects shall be analyzed based on current Energy Conservation Investment Program (ECIP) criteria.

3. Evaluate specific ECO's selected by the Ft. McClellan Department of Engineering and Housing (DEH) to determine their energy savings potential and economic feasibility.

4. Perform a limited site survey to evaluate the buildings containing ECO's included in 2 and 3 above. The site survey shall be documented on forms developed for this project. Any new methods of energy conservation that are identified during the survey which have not been previously investigated shall be considered.

5. Provide programming or implementation documentation for projects developed during the ESOS study. Documentation shall include Project Development Brochures (PDB) and DD Form 1391.

6. Prepare a comprehensive report to document the work performed, the results, and the recommendations.

With this in mind, the study is formatted into three (3) main volumes plus the Executive Summary. Volume I consists of the collected field data. It is in a standard form format and arranged by building number. Volume II consists of the project narrative, all ECO analyses, including calculations, cost estimates and life cycle cost analyses, and supporting documentation. Volume III consists of Programming Documentation (PDB and DD 1391).

II. BUILDING DATA

Ft. McClellan is typical of many military installations in its building inventory. The buildings can be divided into distinct categories according to function:

1. Family Housing
2. Barracks
3. Instructional/Training
4. Administrative
5. Maintenance
6. Recreational/Community
7. Storage/Warehouse

Buildings at Ft. McClellan are typically of masonry construction and poorly insulated because of the warm climate. Heating systems are typically gas-fired or steam/hot water produced by gas-fired boiler plants. Cooling is electric. Following is a listing of the buildings surveyed during the Ft. McClellan Energy Saving Opportunity Survey (ESOS).

BUILDING NUMBER	BUILDING NAME	SQUARE FOOTAGE
51	Officers' Open Mess	22,431
57	Officers' Quarters Military	8,562
63	Administration Bldg	22,811
65	Administration-Gen Purpose	9,882
67	Post Chapel	6,468
128	Skating Rink	13,300
130	Physical Fitness Center	24,440
141	Enl Barracks with Mess	95,193
161	Hutchinson Hall-Theater	5,408
162	Mil Pers Admin Bldg-Classrooms	18,018
163	Administration-Gen Purpose	5,890
215	Post Engineering Bldg	28,563
229	Clothing Sales	11,655
234	Garage Regt Motor Vehicle Storage	17,763
236	G&E Repair Shop	14,214
241B&C	Sup Svc Admin Bldg(Office,Warehouse)	28,000
246	Cold Storage Bldg	23,366
256	Warehouse	24,739
267	Training Aids Bldg	18,728
335	DSGS Weapons Shop	8,572
338	Motor Repair Shop Type SP-4	18,240
500	Reception Station Proc Facility	42,516
501	Enlisted Barracks	33,070
502	Senior Enlisted Barracks	5,796
503	Recreation Bldg	12,300

BUILDING NUMBER	BUILDING NAME	SQUARE FOOTAGE
504	Enlisted Persons Mess	8,502
505	Clothing Issue Facility	37,726
1012	Truman Gym (WAC Gym)	30,409
1020	Enlisted Barracks	36,416
1021	Enlisted Barracks	36,416
1022	Enlisted Barracks	36,416
1023	Enlisted Barracks	36,416
1060	Headquarters (WAC Center)	16,099
1081	Specialist School	80,329
1601	Trainee Barracks	177,540
1602	Trainee Barracks	177,540
1800	Autocraft Shop	8,499
1801	Enlisted Barracks Basic	186,915
1802	Enlisted Barracks Basic	186,915
1881	Academic Facility	85,164
1928	Bowling Alley	21,142
1965	PX (Exchange Main Retail)	58,221
2041	Commissary	60,232
2101	Theater	10,230
2102	Library	7,060
2203	Army Community Center	11,322
2213	Child Support Center	23,898
2220	Enlisted Barracks	36,416
2221	Enlisted Barracks	36,416
2223	Enlisted Barracks	36,416
2224	Enlisted Barracks	36,416
2225	Enlisted Barracks	36,416
2227	Enlisted Barracks	36,416
2275	Enlisted Barracks	25,417
2276	Officers' Quarters-Students	25,147
2291	WAC Post Exchange	8,008
2293	Unit Chapel	8,962
3130	Enlisted Barracks with Mess	81,212
3131	Enlisted Barracks with Mess	81,212
3135	Officers' Quarters Mil	6,768
3138	Motor Repair Shop Bldg D	5,360
3165	Applied Instruction Bldg	6,250
3169	Applied Instruction	6,250
3170	Storehouse V	12,000
3181	General Instruction Bldg	123,712
3182	Military Police Museum	11,696
3184	Applied Instruction Bldg	4,130
3191	Administration-Gen Purpose	23,093
*3202	Company Headquarters	3,729
*3208	Mess Hall	3,975
3212	NCO Open Mess	20,105
*3225	Company Barracks	6,063
*3232	Enlisted Barracks	6,063
*3250	Battalion Headquarters	5,565
*3251	Military Investigations	6,386
*3278	Company Headquarters	2,795

Family Housing: twenty-eight (28) building types, totalling 230 buildings, 571 units

* Typical Buildings for the 3200 area. Represents fifty-five buildings.

III. PRESENT ENERGY CONSUMPTION

Energy at Ft. McClellan is primarily supplied by electricity from Alabama Power Company and natural gas from Alabama Gas Corporation. However, small amounts of oil, coal, and liquid petroleum gas (LPG) are used.

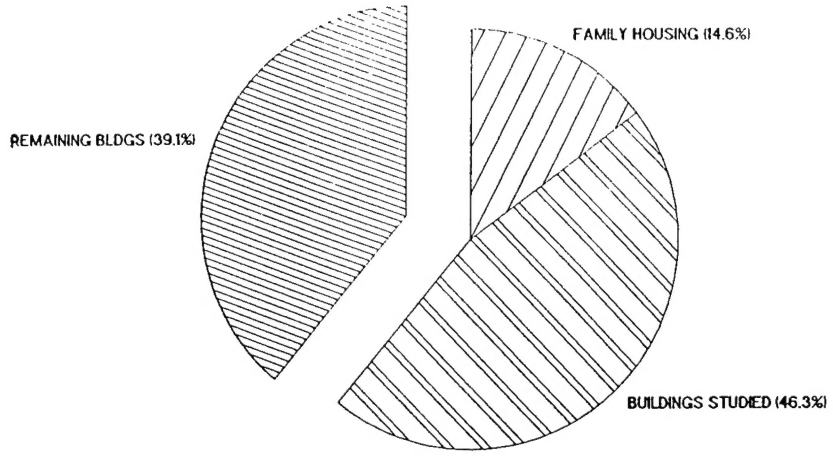
In conducting the ESOS study, fiscal year 1987 (FY 87) was taken as a base year. During this year the installation used a total of 870,900 MBtu of energy at a cost of $6,068,295. Using FY 1985 as the base year for a new ten year energy plan, we see that FY 1987 energy consumption increased by 128,894 million BTU, or 17.37%. This trend is illustrated and discussed in Section IV, Historical Energy Consumption. The energy consumption can be further broken down into each type as shown in Table 1. A breakdown in quantities for LPG, Oil, and Coal was not available. This data was supplied by the Ft. McClellan DEH. The total energy supplied by these three fuels is a minimal portion of the total consumed by the installation. They are therefore grouped by DEH for consumption data record keeping.

TABLE 1. ENERGY CONSUMPTION BY TYPE

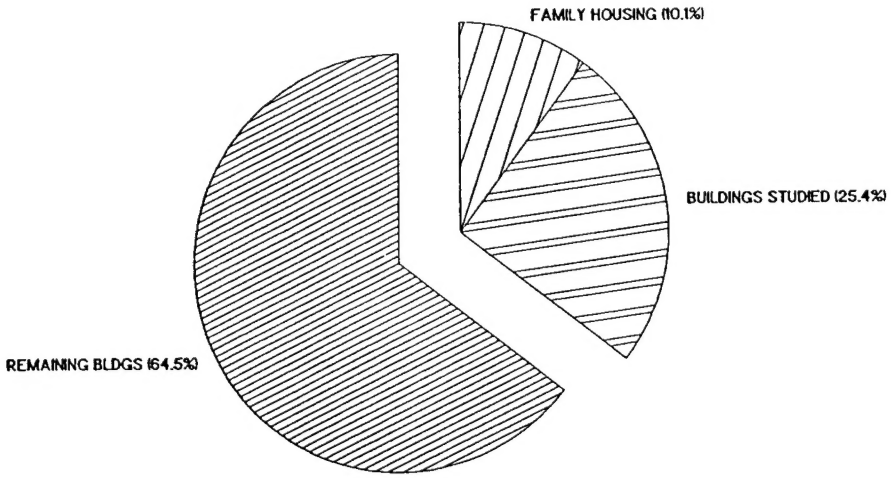
FUEL TYPE	QUANTITY	MBTU	COST
Electricity	77,839 MWH	265,666	3,684,555
Natural Gas	535,131 KCF	551,220	2,095,438
LPG, Oil, Coal	No Report	56,014	288,302

The one hundred twenty-five (125) buildings in the ESOS study have a total area of 2,787,368 square feet. This represents forty-six percent (46%) of the total building area of the post and ten percent of the total buildings. The energy consumption for these buildings is 221,000 million BTU as compared to 870,900 million BTU for the total post. These figures do not contain data for the family housing. Family Housing represents 18.6 percent of the total buildings and 14.6% of the total area. Family housing uses 10.1% of the total energy. These values are illustrated in Figure 1. on the following page.

FIGURE 1. COMPARISON OF BUILDINGS STUDIED TO TOTAL AT BASE



Building Area



MBTU

Buildings	Quantity	MBTU	Area
Family Housing	230	87,882	89,958
Base Buildings	125	221,000	2,787,368
Remaining Buildings	880	562,018	2,351,097

The ten year energy use reduction goal, established in 1975 by the Army Facilities Energy Plan, required a twenty percent (20%) reduction from FY 75 energy use. Data for FY 75 was not available from the post. However, based on FY 77 data (1,105,221 MBTU) the FY 87 energy use of 870,900 million BTU at Ft. McClellan resulted in a reduction of twenty-one percent (21%). The established goal for energy reduction appears to have been met at the installation.

Figure 2 is a graphical representation, on a monthly basis, of the energy consumption by fuel type for FY 1987, while Figure 3 is the energy cost by fuel type.

FIGURE 2. BASEWIDE MONTHLY CONSUMPTION BY FUEL

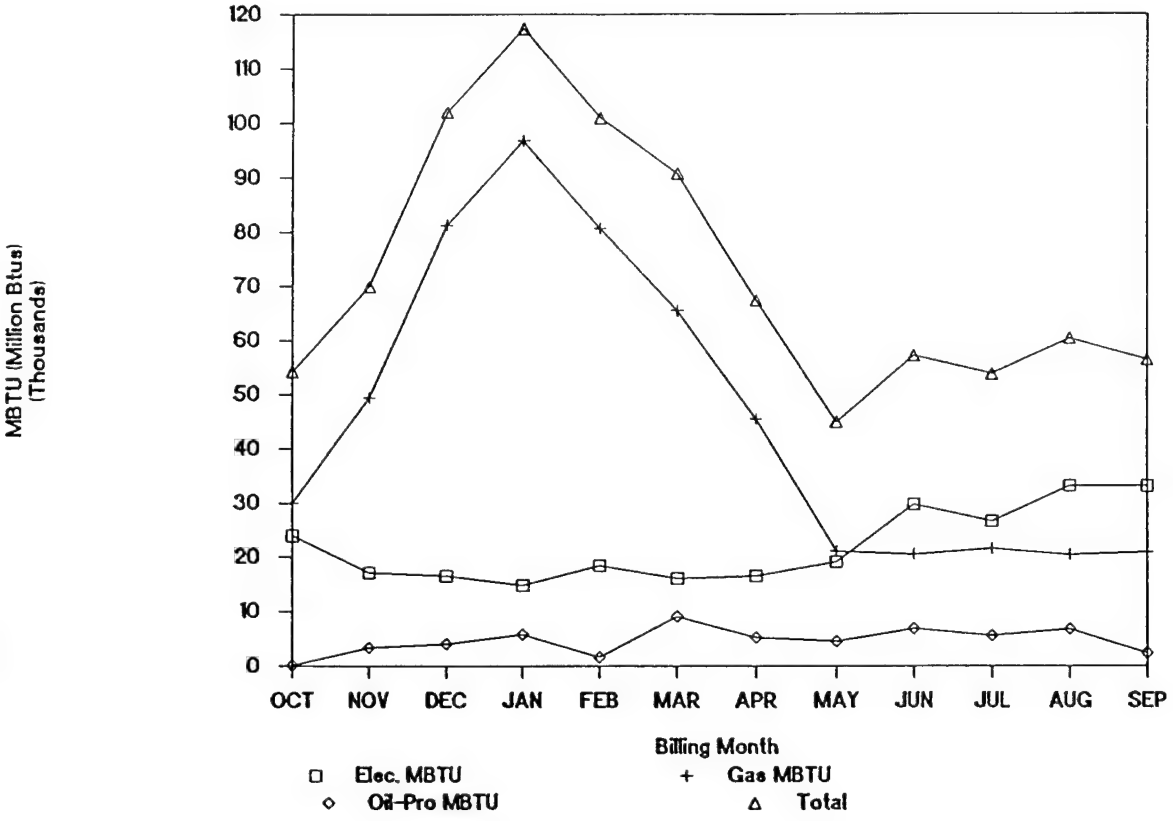
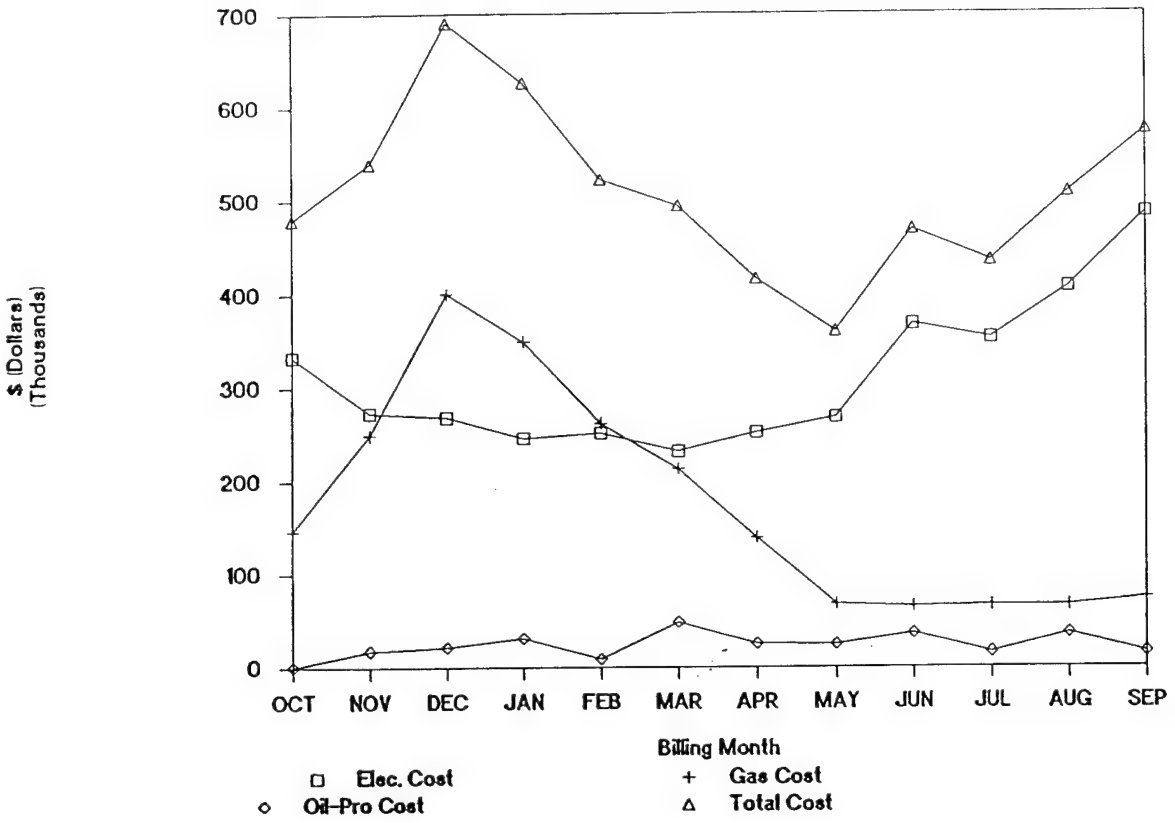


FIGURE 3. BASEWIDE MONTHLY COST BY FUEL



Each of the source fuels can be subcategorized into the three (3) principal areas of consumption at the installation: housing, reserve component, and main post. Figures 4 and 5 graphically represent the monthly energy use of the two (2) main fuel groups by area of consumption, while Figures 6 and 7 represent the energy costs of the fuel types by area of consumption.

FIGURE 4. MONTHLY ELECTRIC CONSUMPTION BY AREA

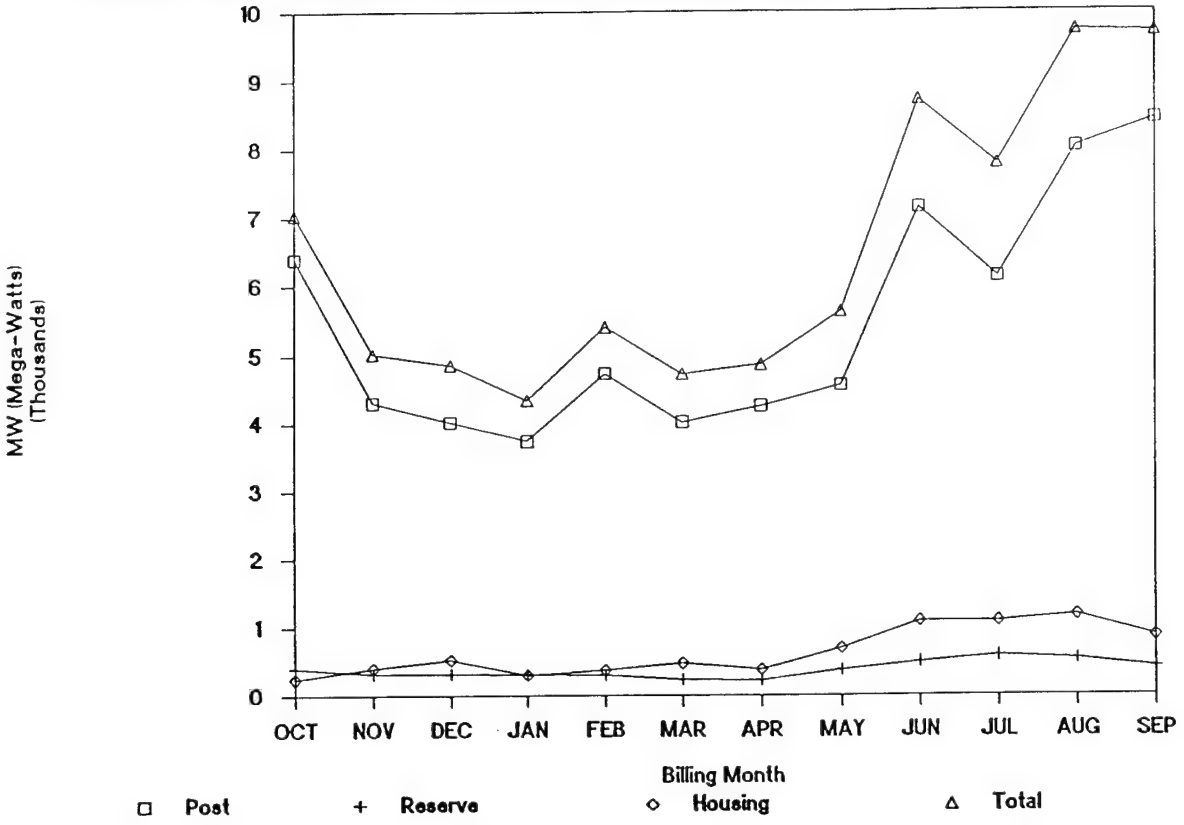


FIGURE 5. MONTHLY NATURAL GAS CONSUMPTION BY AREA

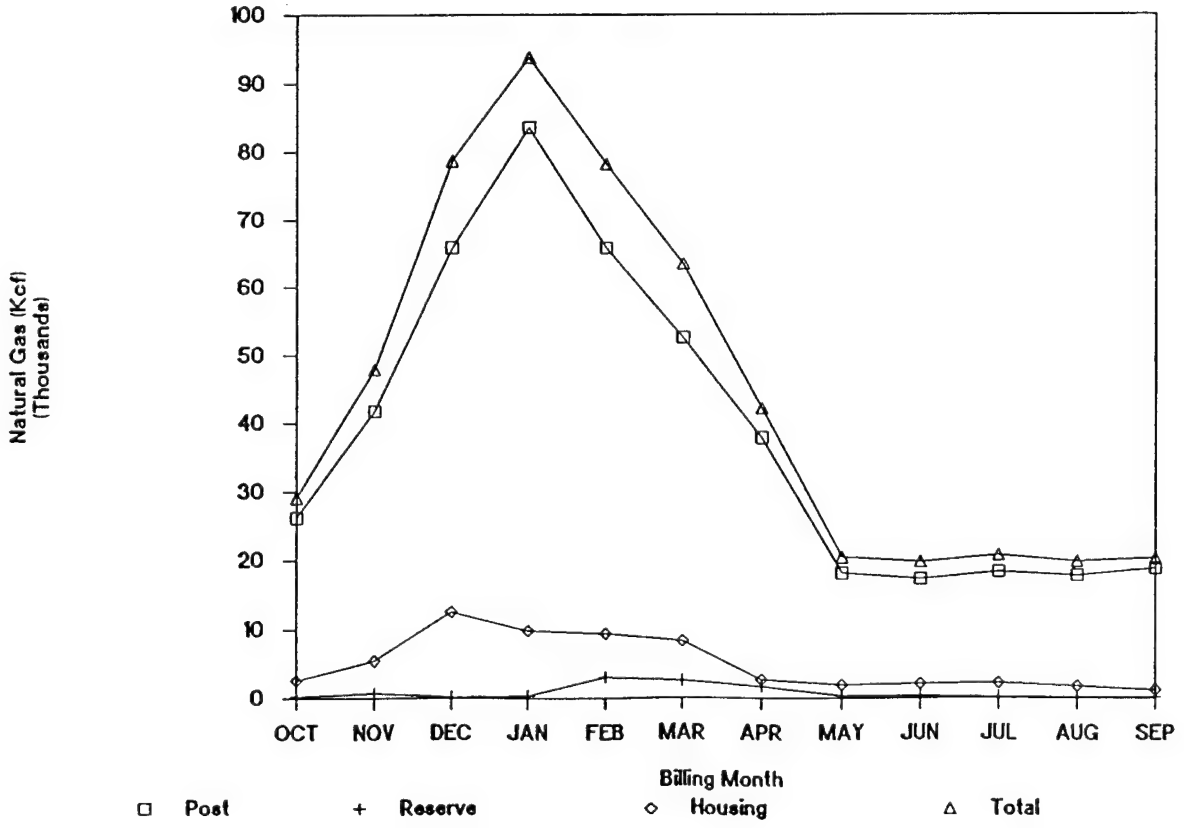


FIGURE 6. MONTHLY ELECTRIC COST BY AREA

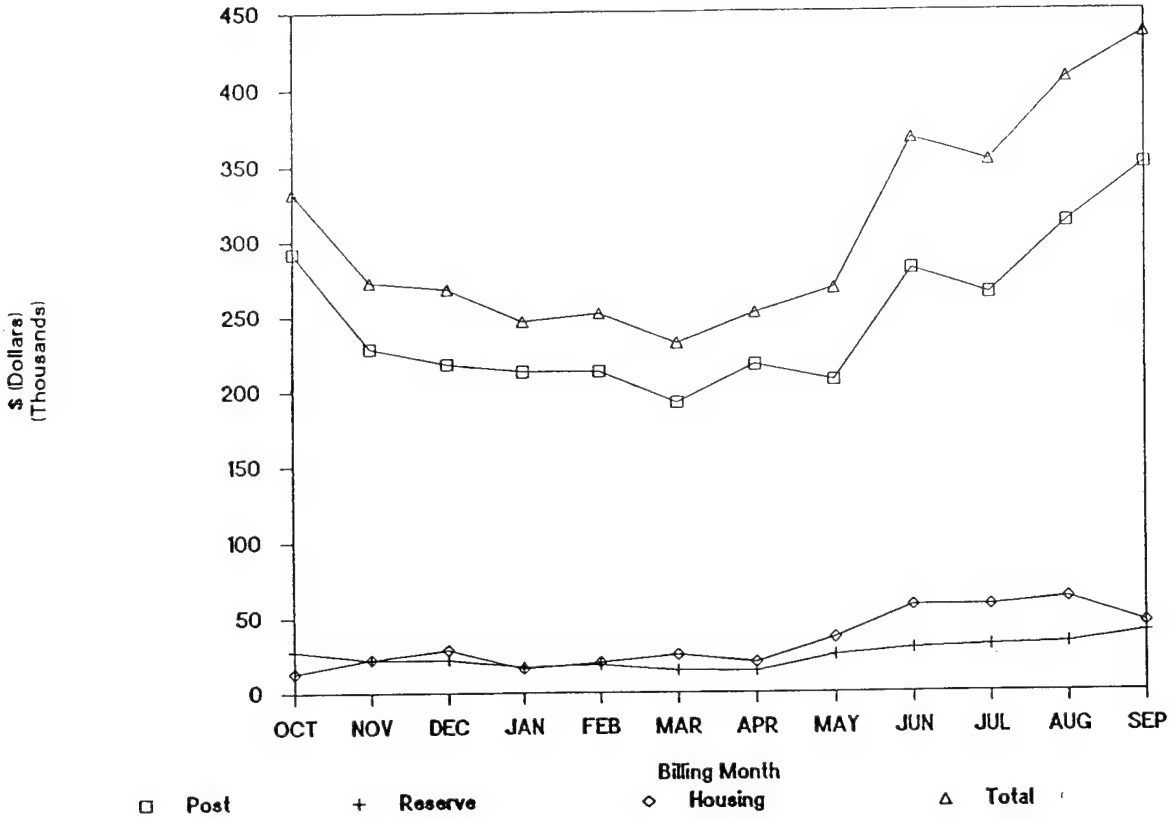
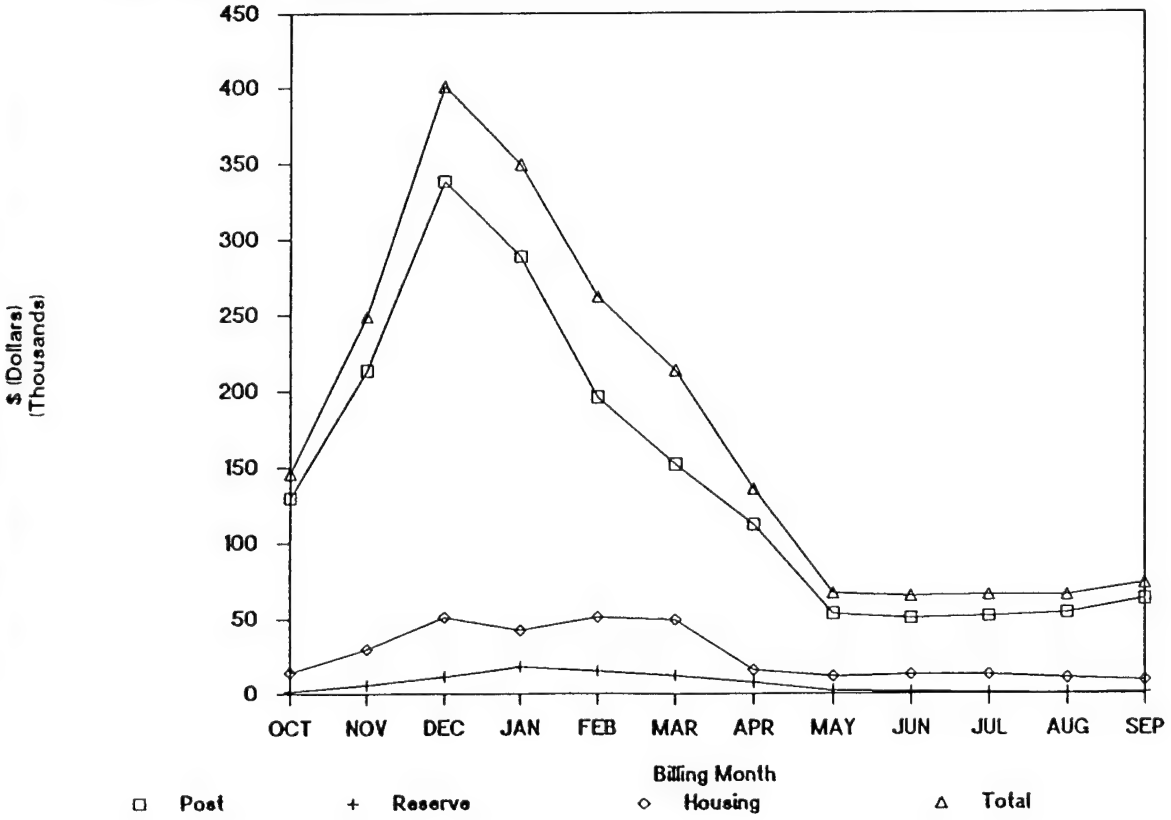


FIGURE 7. MONTHLY NATURAL GAS COST BY AREA



IV. HISTORICAL ENERGY CONSUMPTION

Table 2 illustrates historic energy consumption at Ft. McClellan for the preceding five (5) fiscal years.

TABLE 2. ENERGY CONSUMPTION FOR PRECEDING FIVE YEARS

	ELECTRICITY		NATURAL GAS		OTHER*	
YEAR	QUANTITY (MWH)	MBTU	QUANTITY (KCF)	MBTU	MBTU	TOTAL MBTU
FY 87	77,839	263,666	535,131	551,220	56,014	870,900
FY 86	72,192	246,391	484,412	499,429	16,294	762,114
FY 85	67,638	230,848	481,454	496,379	14,779	742,006
FY 84	64,772	221,067	507,645	523,382	42,729	787,178
FY 83	64,117	218,831	534,588	551,160	17,446	787,438

*LPG, OIL, COAL

As you can see from Table 2, Energy consumption has been increasing for the past two fiscal years. There are no hard facts to pinpoint the cause(s) for this change in pattern. New buildings have been consistently brought on line and the total tonnage of installed air conditioning has increased from 5461 to 8360 tons between 1975 and 1987 (a 53% increase).

However, from viewing the temperature settings in the buildings, the lack of night setback, and the general complacent attitude towards energy conservation resulting from decrease in prices and the gas glut, it appears the major cause of the increase is purely man made. The energy conservation program needs to be made more visable and directed.

V. REEVALUATION PROJECTS RESULTS

The scope of work for the Ft. McClellan ESOS study delineated numerous energy conservation opportunities from the early Basewide Energy Systems Plan to be reevaluated. These were measures that had not been implemented at the installation. Both measures that had earlier been determined feasible and non-feasible were included. Following are brief descriptions of the results of the reevaluations.

1. Solar Heating for Swimming Pool

The reevaluation of this project resulted in non-qualification. Total cost of the project is $124,343 with a yearly savings of $3,273 (861 MBtu). This results in an SIR of 0.34 and amortization period of 38 years. Initial evaluations indicated qualification. The original annual savings calculations were $11,952 (2593 MBtus) at a cost of $175,586. SIR was 1.29.

2. Reduction of Ventilation Air Quantities

The reevaluation of this project resulted in thirty-eight (38) of the forty-seven (47) buildings studied qualifying for implementation. Total cost of the project is $103,594 with a yearly savings of $44,437 (11,694 MBtu). This results in a SIR of 5.6 and an amortization period of 2.33 years.

3. Duct Insulation in Unconditioned Spaces

The field investigation for the reevaluation of this project revealed that the ductwork had interior insulation. The project is, therefore, inappropriate.

4. Window Insulation

The reevaluation of this project confirmed that none of the nine (9) buildings qualified. Economic evaluation resulted in SIR's ranging from 0.30 to 0.65.

5. Boiler Upgrade

The field investigation for this reevaluation revealed that it had been implemented.

6. Ceiling Fans

The reevaluation of this project resulted in four (4) of the six (6) buildings being recommended for implementation. One (1) building had ceiling fans installed and one (1) building had no temperature stratification. Total project cost is $7,129 with a first year cost avoidance of $2,018 (531 MBtu). This results in an SIR of 3.69 and an amortization period of 3.53 years.

7. Heat Recovery from Paint Spray Booths

The reevaluation of this project confirmed its non-qualification. Economic evaluation resulted in a SIR of 0.11

8. Swimming Pool Cover

The reevaluation of the installation of an automatic film cover for the Truman Gym confirmed its economic viability. It is recommended for implementation. Total project cost is $5,120 with a first year cost avoidance of $1,953 (514 MBtu). This results in a SIR of 4.98 and an amortization period of 2.62 years.

9. Night Setback in Family Housing

This project results in a reevaluated cost avoidance of $10,027 the first year at an implementation cost of $114,956 for Family Housing. Resulting SIR is 1.14 and amortization period is 11.46 years. This project is recommended for implementation.

10. Reduce Infiltration

The reevaluation of this project resulted in substantially less savings than previously predicted because results were taken from actual test data (Johns-Manville Study) rather than hypothetical calculations. However, the results still confirmed the viability of the project. At a project implementation cost of $88,781, resultant first year cost avoidance is $16,587 (1,842 MBtu). This results in a SIR of 1.77 and an amortization period of 5.35 years. This project is recommended for implementation.

11. Heat Recovery from Dust Collectors

The reevaluation of this project confirmed its non-qualification. Economic evaluation resulted in a SIR of 0.32.

12. Water Heater Tank Insulation

The reevaluation of this project resulted in non-qualification. Economic evaluation confirmed SIR values less than 1.0 for both contractor installation and implementation of a self-help program.

13. Low Pressure Sodium Street Lighting

The reevaluation of this project confirmed its non-qualification. At an installation cost of $75,950 and first year cost avoidance of $4,207 (296 MBtu) the SIR is 0.66.

14. Fluorescent Lighting Ballast Replacement

The reevaluation of this project resulted in qualification. Evaluated on a per unit basis the resultant SIR is 1.03 for direct replacement and 7.16 for replacement on a burn-out basis.

15. Air Curtain for Warehouse Loading Door

The reevaluation of this project confirmed its non-qualification. An installation cost of $2,999 resulted in a first year cost avoidance of $83 (21.9 MBtu). Economic analysis resulted in a SIR of 0.36.

16. Power Factor Improvement

Although this ECO does not save energy, it does produce avoided costs. The life cycle cost analysis produces an SIR of 1.62. With resultant savings of $11,348 per year, the amortization period is 7.14 years. This ECO is recommended for implementation.

VI. ENERGY CONSERVATION ANALYSIS

A. Energy Conservation Opportunities from Scope of Work

1. Solar Domestic Hot Water Heating

This ECO evaluated the feasibility of solar DHW for buildings 215, 1601, 1602, 3232 and the Truman Gym. Due to high installation costs and low costs for natural gas, none of the buildings met minimum economic criteria. SIRs ranged from 0.10 to 0.22.

2. Passive Solar Retrofit

This ECO evaluated the feasibility of a passive solar retrofit for a "typical" 3200 area building. With a construction cost of $9,750 and a first year cost avoidance of $253 (67 MBtu), the economic analysis results in a SIR of 0.34 and does not qualify.

3. Drop Ceilings and Install Insulation

This ECO evaluated new ceilings and insulation in buildings 241B, 241C and 3182. The project proved to be uneconomical due to high installation costs and minimal savings. SIRs ranged from 0.22 to 0.79. The project did not qualify.

4. Exterior Insulation of Masonry Block Walls

This ECO evaluated wall insulation for buildings 215, 3130, 3131, 3181, 3182, and the 3200 barracks area. In addition, all buildings except 215 were studied with a window upgrade at the time of insulation. Of the eleven (11) building types studied, none qualified for wall insulation and none qualified with the window upgrade included. At an installation cost of $379,979 for the total project, the first year's cost avoidance is $21,809 (4,698 MBtu). Economic analysis results in a SIR of 0.68 and an amortization period of 17.42 years.

5. Replace Kitchen Light Fixtures

This ECO investigated the replacement of existing incandescent kitchen light fixtures with fluorescent fixtures, in the family housing units. Analysis revealed first year energy cost avoidance of $7,973 (561 MBtu) and an annual maintenance savings of $1,929. At an implementation cost of $39,160, economic analysis results in a SIR of 2.18 and an amortization period of 3.95 years. This project qualifies for implementation.

6. Reduce Lighting Levels

Field investigation revealed that lighting levels were already at the minimum levels for the functions performed. Project is not feasible.

7. Automatic Lighting Turnoff (Occupancy Sensors)

Field investigation revealed lighting was adequately controlled by personnel. Occupancy sensor installation is not feasible.

8. Insulate Steam and Condensate Lines

Field investigation for this ECO revealed that it had been implemented.

9. Repair/Revise HVAC Controls

Field investigation revealed the controls for these buildings to be operating but have been tampered with and/or disconnected. Also, the HVAC systems are not being operated according to original design. The DEH at Ft. McClellan is currently correcting these deficiencies. Energy usage will increase when this is completed. Project is not feasible.

10. Steam Trap Repair/Replacement

Evaluation of this ECO revealed significant savings. At an initial implementation cost of $6,494, the project results in first year cost avoidance of $24,352 (6,408.3 MBtu). Economic analysis results in the project qualifying with a SIR of 33.41 and an amortization period of 0.27 years.

B. Energy Conservation Opportunities from Limited Site Survey

1. Flow Restrictors

This ECO investigated the feasibility of installing flow restrictors on shower heads, lavatory faucets, and kitchen sinks in the 571 family housing units as well as buildings 1012, 1601, 1602, 1801, 1802, 3130, and 3131. Analysis produced potential cost avoidance of $26,104 per year (6,870 MBtu) at an installation cost of $160,276. Economic analysis results in a SIR of 2.12 and an amortization period of 6.14 years. The project qualifies.

2. Cooling Tower Improvement

Domestic water from the Post's main supply is currently being used as cooling water for the refrigeration equipment at the Commissary Building and is then wasted. This project investigated the feasibility of installing a cooling tower to provide condenser water. Although this project will increase energy consumption, it will save money by conserving water. **Total energy increase will be 644.2 MBtu per year or $9,154. The composite avoided cost, however, is $68,171.** At an installed cost of $43,739, the project has an amortization period of 0.64 years and an SIR of 14.75. Project is recommended for implementation.

3. Exit Light Replacement

This ECO investigated the replacement of exit lights with "self-powered" exit lights. Analysis resulted in a SIR of 1.47. The project implementation cost is $117,423 with a first year energy cost avoidance of $8,995 (633 MBtu) and non energy costs avoidance of $10,600. The project qualifies.

4. Steam Isolation Valve

Building 161 is seldom used but is conditioned throughout the heating season. Installation of an automatic isolation valve will save 135.3 MBtu per year or $514. Installation cost of $2,552 results in an SIR of 2.63 and an amortization period of 4.96 years.

5. Reset Thermostats to TRADOC Regulation Temperatures

Actual space temperatures are currently set at levels in excess of TRADOC standards. This measure requires initial resetting and regular inspection. Projected manpower costs of $41,324 will produce savings of 88,538.5 MBtu annually with an avoided cost of$336,446. This has an SIR of 97.13 and an amortization period of 0.12 years. It is recommended for implementation as a low cost/no cost policy change. All other recommended measures which are affected by space temperature have been analyzed based on regulation temperatures.

6. Night Setback - Basewide

Manual night setback is addressed as a low cost/no cost policy change project since design of an EMCS system at the base is underway. Savings of 8,892 MBtus will result ($33,789). These savings have been included to further reinforce the need for an operable EMCS at Ft. McClellan. An SIR calculation is not applicable due to no construction cost to implement as a basewide policy.

7. Lower Domestic Hot Water Temperature

Implementation of this project is recommended. Annual savings of 7,863.0 MBtu per year which amounts to annual cost savings of $30,986. An SIR of 30.55 results from the estimated construction cost of $13,006. The project's amortization period is 0.42 years.

VII. PROJECTS DEVELOPED

Five projects have been developed from the recommended ECO's. Since development of ECIP (Energy Conservation Investment Program) projects is an exercise in futility due to practical nonexistance of ECIP funds, these five projects meet criteria for either PECIP (Productivity Enhancing Capital Investment Program) or PIF (Productivity Investment Funding) funding.

Individual measures have therefore been grouped together to form projects with an overall simple payback period less than 4.0 years. Similar projects have been grouped together to form logical projects so that similar types of work will be addressed in each grouping. Listings of all ECOs included in each group is included in Attachment D. Overall totals for each group are listed below:

Group #1 - Eighteen (18) ECO's addressing reduction of ventilation air quantities in various buildings and reduction of infiltration in Family Housing.

Annual Energy Savings	- 7,153 MBtu - Natural Gas 921 MBtu - Electricity
Annual Energy Cost Savings	- $27,182 - Natural Gas $13,087 - Electricity
Annual Non-Energy Savings	- $ -0-
Total Annual Cost Savings	- $40,269
Construction Cost	-$144,869
Overall SIR	- 3.22
Simple Payback	- 3.60 years

Group #2 - Two ECO's addressing cooing tower improvement in Building 2041 and night setback in Family Housing.

Annual Energy Savings	- 2,639 MBtu - Natural Gas (644) MBtu - Electricity
Annual Energy Cost Savings	- $10,027 - Natural Gas $(9,154) - Electricity
Annual Non-Energy Savings	- $77,325
Total Annual Cost Savings	- $78,198
Construction Cost	-$158,695

Group #2 (Continued)

Overall SIR	-	4.75
Simple Payback	-	2.03 years

Group #3 - Fifty-four (54) ECO's addressing power factor improvement for the Base electrical distribution system, energy efficient kitchen lights in Family Housing, reduction of ventilation air quantities in various buildings, installation of ceiling fans in four buildings and an automatic pool cover for Building 1012.

Annual Energy Savings	-	6,507 MBtu - Natural Gas 561 MBtu - Electricity
Annual Energy Cost Savings	-	$24,725 - Natural Gas $ 7,973 - Electricity
Annual Non-Energy Savings	-	$13,277
Total Annual Cost Savings	-	$45,976
Construction Cost		-$180,120
Overall SIR	-	2.84
Simple Payback	-	3.92 years

Group #4 - Five (5) ECOs addressing steam trap repair, flow restrictors in Family Housing and the Barracks, a steam isolation valve for Building 161 and lowering domestic hot water temperature in Base buildings.

Annual Energy Savings	-	16,748 MBtu - Natural Gas 106 MBtu - Electricity
Annual Energy Cost Savings	-	$63,642 - Natural Gas $ 1,510 - Electricity
Annual Non-Energy Savings	-	$-0-
Total Annual Cost Savings	-	$65,152
Construction Cost		-$173,003
Overall SIR	-	4.87
Simple Payback	-	2.66 years

Group #5 - Two (2) ECO's addressing exit light replacement - Basewide and lowering domestic hot water temperature in Family Housing.

Annual Energy Savings	- 4,192 MBtu - Natural Gas 633 MBtu - Electricity
Annual Energy Cost Savings	- $15,928 - Natural Gas $ 8,990 - Electricity
Annual Non-Energy Savings	- $10,600
Total Annual Cost Savings	- $35,518
Construction Cost	-$126,748
Overall SIR	- 3.00
Simple Payback	- 3.57 years

VIII. POLICY CHANGE RECOMMENDATIONS

Three (3) of the recommended ECO's, Reset Thermostats to TRADOC Regulation Temperatures, Night Setback - Basewide and Fluorescent Ballast Replacement, are not included in the developed projects. These projects are recommended as Policy Change Recommendations.

As previously mentioned, energy consumption at Ft. McClellan has been increasing for the past two fiscal years. Much new construction has taken place, however, it appears that much of this increase is avoidable. The first two Policy Change Recommendations, resetting temperatures and manual night setback, will reduce annual energy consumption by 11% (from FY 87).

Fluorescent Ballast Replacement on a per unit basis is feasible for both direct replacement (SIR = 1.03) and replacement on a burn-out basis (SIR = 7.16). Since feasibility of this project, for direct replacement, is marginal and primarily due to rated life data for ballasts, replacement on a burn-out basis is recommended.

During the Limited Site Survey, many ventilation (outside air) dampers were found which had been disconnectd and shut. Ventilation is very important since outside air intake and resulting relief air is necessary to provide clean, healthy air in the buildings. Ventilation air must be heated or cooled, which consumes energy. However, **proper ventilation is necessary.** Minimum ventilation of 15 CFM/person should be provided by all air systems on base to eliminate germs in the buildings, thus providing a healthy environment for Base personnel.

IX. RECOMMENDATIONS FOR FUTURE STUDY

Energy conservation should always be a major concern when new buildings are built and existing buildings are renovated. The increase in energy consumption at Ft. McClellan and conditions found at the base indicate a complacent attitude towards energy conservation. This attitude is not unusual today, due to recent reductions in gas prices. An effective energy conservation program, however, requires a continuous, dedicated effort by everyone at a facility. Policies made and actions taken by all personnel should always consider effective use of energy.

Options for Renewable Resources (Heat Recovery, Solar, Biomass and Municipal Waste) should always be considered when an application is available. Many solar and heat recovery projects are addressed in this ESOS study and none are presently feasible due to low fuel and high construction costs. These projects should be reconsidered if fuel costs increase. During performance of this study, we have become aware of a high degree of interest among surrounding municipalities to evaluate economics of a resource recovery plant. This interest arises from a combined concern for development of long term actions which would help alleviate current waste disposal problems experienced by these cities.

Ft. McClellan would appear to be a logical candidate for the location of a resource recovery plant. This is evidenced by the fact that district steam and hot water plants are presently used on the base.

Any analysis of the economic ramifications of such a project would, through necessity, indicate that energy purchased from a Third Party Resource Recovery Plant would result in lowered energy and waste removal costs to the Federal Government.

Many boiler plants on base currently produce high temperature hot water (typically $360^{\circ}F$). Utilizing lower temperature hot water will greatly reduce distribution system losses. This modification has been successful at other Army institutions and should be considered at Ft. McClellan.

X. SUMMARY

Implementation of all recommended ECO's will result in the following energy and cost savings, construction cost, and overall SIR.

Total Energy Savings:	38,815.1 MBtus
First Year Cost Avoidance:	$265,114
Construction Cost:	$783,434
Overall SIR:	3.77
Amortization Period:	2.96 years

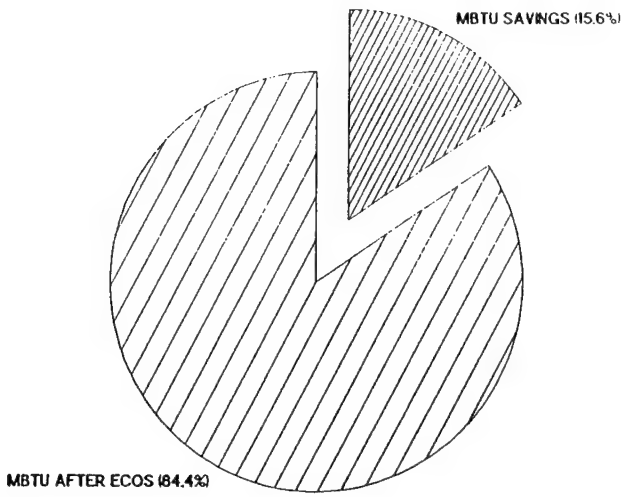
When the policy change recommendations (Night Setback & Temperature Setback) are included, the following savings, cost and overall SIR will result:

Total Energy Savings:	136,254.4 MBtus
First Year Cost Avoidance:	$594,025
Construction Cost:	$824,758
Overall SIR:	8.98
Amortization Period:	1.39 years

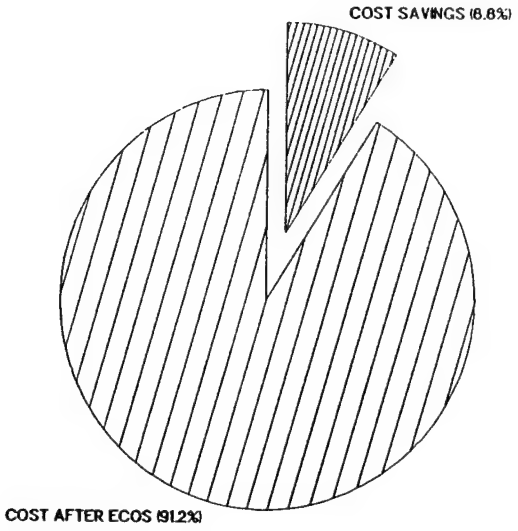
Additional savings can also be achieved with replacement of standard fluorescent ballasts, when they burn-out, with energy efficient ballasts.

This represents savings of 15.6% of current energy consumption in MBtus and 8.8% of current energy costs. This is further illustrated in Figure 8. on the following page.

FIGURE 8. SAVINGS POTENTIAL



Energy Savings



Cost Savings

	Savings	Resulting after ECOs
Energy	136,245.4 MBtu	734,654.6
Energy Cost	$534,148	$5,534,147

EXECUTIVE SUMMARY

ATTACHMENT INDEX

EXECUTIVE SUMMARY
ATTACHMENT A

SUMMARY OF RECOMMENDED ECO'S
GROUPED BY TYPE
RANKED BY SIR

SUMMARY OF RECOMMENDED ECO'S GROUPED BY TYPE
RANKED BY SIR

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
BASEWIDE	RESET THERMOSTATS		88,538.5	$336,446	0.0	$0	($41,324)	$295,122	$41,324	97.13	0.14
BASEWIDE	NIGHT SETBACK		8,891.8	$33,789	0.0	$0	$0	$33,789	$0	N/A	0.00
	SUBTOTALS		97,430.3	$370,235	0.0	$0	($41,324)	$328,911	$41,324	107.80	0.13
BASEWIDE	STEAM TRAP REPAIR		6,408.3	$24,352	0.0	$0	$0	$24,352	$6,494	33.41	0.27
BASEWIDE	LOWER DHW TEMP-BASE & FH		7,756.8	$29,476	106.2	$1,510	$0	$30,986	$13,006	30.55	0.42
2041	COOLING TOWER IMPROVEMENT		0.0	$0	(644.2)	($9,154)	$77,325	$68,171	$43,739	14.25	0.64
TOTAL	REDUCE OUTSIDE AIR		11,693.8	$44,437	0.0	$0	$0	$44,437	$103,594	5.60	2.33
1012	SWIMMING POOL COVER		514.0	$1,953	0.0	$0	$0	$1,953	$5,120	4.98	2.62
4 BLDGS	CEILING FANS		531.0	$2,018	0.0	$0	$0	$2,018	$7,129	3.69	3.53
161	STEAM ISOLATION VALVE		135.3	$514	0.0	$0	$0	$514	$2,552	2.63	4.96
F HOUSING	EFFICIENT LIGHTING SOURCE		0.0	$0	561.1	$7,973	$1,929	$9,903	$39,160	2.18	3.95
BASEWIDE	FLOW RESTRICTORS		6,639.2	$25,229	0.0	$0	$0	$25,229	$160,276	2.05	6.35
F HOUSING	REDUCE INFILTRATION		921.0	$3,500	921.0	$13,087	$0	$16,587	$88,781	1.77	5.35
BASEWIDE	POWER FACTOR IMPROVEMENT		0.0	$0	0.0	$0	$11,348	$11,348	$81,204	1.62	7.16
BASEWIDE	EXIT LIGHT REPLACEMENT		0.0	$0	632.7	$8,990	$10,600	$19,590	$117,423	1.47	5.99
F HOUSING	NIGHT SETBACK		2,638.8	$10,027	0.0	$0	$0	$10,027	$114,956	1.14	11.46
	SUBTOTALS		**37,238.3**	**$141,506**	**1,576.8**	**$22,407**	**$101,202**	**$265,114**	**$783,434**	**3.77**	**2.96**
	OVERALL TOTALS		**134,668.6**	**$511,741**	**1,576.8**	**$22,407**	**$59,878**	**$594,025**	**$824,758**	**8.98**	**1.39**

EXECUTIVE SUMMARY
ATTACHMENT B

SUMMARY OF RECOMMENDED ECO'S
RANKED BY SIR

SUMMARY OF RECOMMENDED ECO'S
RANKED BY SIR

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
BASEWIDE	RESET THERMOSTATS		88,538.5	$336,446	0.0	$0	($41,324)	$295,122	$41,324	97.13	0.14
BASEWIDE	NIGHT SETBACK		8,891.8	$33,789	0.0	$0	$0	$33,789	$0	N/A	0.00
	SUBTOTALS		97,430.3	$370,235	0.0	$0	($41,324)	$328,911	$41,324	107.80	0.13
BASEWIDE	LOWER DHW TEMPERATURE		3,565.1	$13,547	106.2	$1,510	$0	$15,057	$3,681	51.50	0.24
BASEWIDE	STEAM TRAP REPAIR		6,408.3	$24,352	0.0	$0	$0	$24,352	$6,494	33.41	0.27
F HOUSING	LOWER DHW TEMPERATURE		4,191.7	$15,928	0.0	$0	$0	$15,928	$9,325	22.28	0.59
1081	REDUCE OUTSIDE AIR		759.3	$2,885	0.0	$0	$0	$2,885	$2,494	15.09	0.86
2041	COOLING TOWER IMPROVEMENT		0.0	$0	(644.2)	($9,154)	$77,325	$68,171	$43,739	14.25	0.64
3165	REDUCE OUTSIDE AIR		135.2	$514	0.0	$0	$0	$514	$506	13.25	0.98
1801	REDUCE OUTSIDE AIR		2,128.0	$8,086	0.0	$0	$0	$8,086	$8,423	12.52	1.04
1802	REDUCE OUTSIDE AIR		2,128.0	$8,086	0.0	$0	$0	$8,086	$8,423	12.52	1.04
504	REDUCE OUTSIDE AIR		99.8	$379	0.0	$0	$0	$379	$396	12.49	1.04
505	REDUCE OUTSIDE AIR		115.8	$440	0.0	$0	$0	$440	$589	9.74	1.34
3212	REDUCE OUTSIDE AIR		279.2	$1,061	0.0	$0	$0	$1,061	$1,657	8.35	1.56
2291	REDUCE OUTSIDE AIR		130.9	$497	0.0	$0	$0	$497	$856	7.59	1.72
130	CEILING FANS		329.0	$1,250	0.0	$0	$0	$1,250	$2,197	7.42	1.76
1881	REDUCE OUTSIDE AIR		307.7	$1,169	0.0	$0	$0	$1,169	$2,429	6.28	2.08
63	REDUCE OUTSIDE AIR		329.3	$1,251	0.0	$0		$1,251	$2,771	5.89	2.21
502	REDUCE OUTSIDE AIR		99.8	$379	0.0	$0	$0	$379	$856	5.78	2.26
1601	REDUCE OUTSIDE AIR		869.4	$3,304	0.0	$0	$0	$3,304	$8,423	5.12	2.55
1602	REDUCE OUTSIDE AIR		869.4	$3,304	0.0	$0	$0	$3,304	$8,423	5.12	2.55
1012	POOL COVER		514.0	$1,953	0.0	$0	$0	$1,953	$5,120	4.98	2.62
2102	REDUCE OUTSIDE AIR		29.9	$114	0.0	$0	$0	$114	$322	4.60	2.83
500	REDUCE OUTSIDE AIR		192.4	$731	0.0	$0	$0	$731	$2,136	4.47	2.92
2	EFFICIENT LIGHTING SOURCE	15	0.0	$0	32.0	$454	$82	$536	$1,050	4.39	1.96
3400	EFFICIENT LIGHTING SOURCE	5	0.0	$0	10.7	$151	$27	$179	$350	4.39	1.96
3504	EFFICIENT LIGHTING SOURCE	7	0.0	$0	29.8	$424	$76	$500	$980	4.39	1.96
2275	REDUCE OUTSIDE AIR		329.0	$1,250	0.0	$0	$0	$1,250	$3,775	4.32	3.02
2276	REDUCE OUTSIDE AIR		329.0	$1,250	0.0	$0	$0	$1,250	$3,775	4.32	3.02
3184	REDUCE OUTSIDE AIR		19.6	$74	0.0	$0	$0	$74	$258	3.77	3.46
163	REDUCE OUTSIDE AIR		51.7	$196	0.0	$0	$0	$196	$681	3.76	3.47
338	CEILING FANS		124.0	$471	0.0	$0	$0	$471	$1,645	3.74	3.49
3135	REDUCE OUTSIDE AIR		242.4	$921	0.0	$0	$0	$921	$3,295	3.65	3.58
3191	REDUCE OUTSIDE AIR		89.7	$341	0.0	$0	$0	$341	$1,242	3.58	3.64
82	EFFICIENT LIGHTING SOURCE	6	0.0	$0	9.1	$129	$42	$171	$420	3.52	2.46
102	EFFICIENT LIGHTING SOURCE	6	0.0	$0	9.1	$129	$42	$171	$420	3.52	2.46
1965	REDUCE OUTSIDE AIR		112.2	$426	0.0	$0	$0	$426	$1,584	3.51	3.71
3500	EFFICIENT LIGHTING SOURCE	6	0.0	$0	36.1	$513	$168	$682	$1,680	3.51	2.46
3531	EFFICIENT LIGHTING SOURCE	2	0.0	$0	15.1	$214	$70	$284	$700	3.51	2.46
3502	EFFICIENT LIGHTING SOURCE	12	0.0	$0	108.0	$1,535	$505	$2,040	$5,039	3.50	2.47
3505	EFFICIENT LIGHTING SOURCE	5	0.0	$0	15.0	$213	$70	$283	$700	3.50	2.47
20	EFFICIENT LIGHTING SOURCE	1	0.0	$0	2.0	$28	($1)	$28	$70	3.34	2.54

SUMMARY OF RECOMMENDED ECO'S
RANKED BY SIR

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
162	REDUCE OUTSIDE AIR		70.1	$266	0.0	$0	$0	$266	$1,040	3.34	3.91
BARRACKS	FLOW RESTRICTORS		3,714.2	$14,114	0.0	$0	$0	$14,114	$60,116	3.06	4.26
3501	EFFICIENT LIGHTING SOURCE	5	0.0	$0	11.5	$163	$70	$233	$700	2.89	3.01
141	REDUCE OUTSIDE AIR		680.4	$2,586	0.0	$0		$2,586	$12,008	2.81	4.64
3181	REDUCE OUTSIDE AIR		157.5	$599	0.0	$0	$0	$599	$2,832	2.76	4.73
2220	REDUCE OUTSIDE AIR		69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2221	REDUCE OUTSIDE AIR		69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2223	REDUCE OUTSIDE AIR		69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2224	REDUCE OUTSIDE AIR		69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2225	REDUCE OUTSIDE AIR		69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2227	REDUCE OUTSIDE AIR		69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
161	STEAM ISOLATION VALVE		135.3	$514	0.0	$0	$0	$514	$2,552	2.63	4.96
3131	REDUCE OUTSIDE AIR		440.5	$1,674	0.0	$0	$0	$1,674	$9,478	2.30	5.66
67	REDUCE OUTSIDE AIR		44.5	$169	0.0	$0	$0	$169	$993	2.22	5.88
503	REDUCE OUTSIDE AIR		46.2	$176	0.0	$0	$0	$176	$1,033	2.22	5.88
3301	EFFICIENT LIGHTING SOURCE	2	0.0	$0	3.5	$50	$7	$57	$238	2.06	4.17
1020	REDUCE OUTSIDE AIR		57.0	$217	0.0	$0	$0	$217	$1,546	1.83	7.13
1021	REDUCE OUTSIDE AIR		57.0	$217	0.0	$0	$0	$217	$1,546	1.83	7.13
1023	REDUCE OUTSIDE AIR		57.0	$217	0.0	$0	$0	$217	$1,546	1.83	7.13
161	REDUCE OUTSIDE AIR		19.5	$74	0.0	$0	$0	$74	$534	1.82	7.18
F HOUSING	REDUCE INFILTRATION		921.0	$3,500	921.0	$13,087	$0	$16,587	$88,781	1.77	5.35
1	EFFICIENT LIGHTING SOURCE	1	0.0	$0	0.9	$13	$2	$14	$70	1.76	4.88
17	EFFICIENT LIGHTING SOURCE	3	0.0	$0	2.7	$38	$5	$43	$210	1.76	4.88
81	EFFICIENT LIGHTING SOURCE	10	0.0	$0	8.9	$126	$17	$144	$700	1.76	4.88
3310	EFFICIENT LIGHTING SOURCE	19	0.0	$0	33.6	$478	$65	$543	$2,660	1.75	4.90
3402	EFFICIENT LIGHTING SOURCE	7	0.0	$0	12.4	$176	$24	$200	$980	1.75	4.90
3610	EFFICIENT LIGHTING SOURCE	50	0.0	$0	88.5	$1,258	$171	$1,429	$6,999	1.75	4.90
BASEWIDE	POWER FACTOR IMPROVEMENT		0.0	$0	0.0	$0	$11,348	$11,348	$81,204	1.62	7.16
3737	EFFICIENT LIGHTING SOURCE	30	0.0	$0	34.2	$486	$149	$635	$3,577	1.54	5.63
BASEWIDE	EXIT LIGHT REPLACEMENT		0.0	$0	632.7	$8,990	$10,600	$19,590	$117,423	1.47	5.99
F HOUSING	FLOW RESTRICTORS		2,925.1	$11,115	0.0	$0	$0	$11,115	$100,160	1.45	9.01
25	EFFICIENT LIGHTING SOURCE	6	0.0	$0	6.9	$98	$30	$128	$840	1.32	6.57
3661	EFFICIENT LIGHTING SOURCE	1	0.0	$0	1.2	$16	$5	$21	$140	1.32	6.57
3532	EFFICIENT LIGHTING SOURCE	1	0.0	$0	2.3	$33	$10	$43	$280	1.31	6.59
3700	EFFICIENT LIGHTING SOURCE	4	0.0	$0	18.3	$260	$80	$340	$2,240	1.31	6.59
3719	EFFICIENT LIGHTING SOURCE	7	0.0	$0	32.1	$456	$140	$595	$3,919	1.31	6.59
3720	EFFICIENT LIGHTING SOURCE	6	0.0	$0	13.7	$195	$60	$255	$1,680	1.31	6.59
234	CEILING FANS		28.0	$106	0.0	$0	$0	$106	$1,090	1.27	10.24
21	EFFICIENT LIGHTING SOURCE	4	0.0	$0	10.0	$142	($18)	$124	$840	1.25	6.75
3706	EFFICIENT LIGHTING SOURCE	6	0.0	$0	13.7	$195	$30	$225	$1,680	1.15	7.46
F HOUSING	NIGHT SETBACK		2,638.8	$10,027	0.0	$0	$0	$10,027	$114,956	1.14	11.46
1012	CEILING FANS		50.0	$190	0.0	$0	$0	$190	$2,197	1.13	11.56
	SUBTOTALS		37,238.3	$141,506	1,576.8	$22,407	$101,202	$265,114	$783,434	3.77	2.96
	OVERALL TOTALS		134,668.6	$511,741	1,576.8	$22,407	$59,878	$594,025	$824,758	8.98	1.39

EXECUTIVE SUMMARY
ATTACHMENT C

SUMMARY OF ANALYZED ECO'S
LISTED BY BUILDING

SUMMARY OF ANALYZED ECO'S
LISTED BY BUILDING

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
POLICY CHANGE RECOMMENDATIONS											
BASEWIDE	RESET THERMOSTATS		88,538.5	$336,446	0.0	$0	($41,324)	$295,122	$41,324	97.13	0.14
	NIGHT SETBACK		8,891.8	$33,789	0.0	$0	$0	$33,789	$0	N/A	0.00
ANALYZED ENERGY CONSERVATION OPPORTUNITIES											
BARRACKS	FLOW RESTRICTORS		3,714.2	$14,114	0.0	$0	$0	$14,114	$60,116	3.06	4.26
BASEWIDE	STEAM TRAP REPAIR		6,408.3	$24,352	0.0	$0	$0	$24,352	$6,494	33.41	0.27
	LPS STREET LIGHTING 180W		0.0	$0	296.1	$4,207	$350	$4,557	$75,950	0.66	16.67
	LPS STREET LIGHTING 55W		0.0	$0	2,105.0	$29,912	$10,000	$39,912	$1,262,123	0.35	31.62
	REPLACE BALLASTS-BURNOUT BASIS		0.0	$0	0.2	$3	$2	$4	$6	7.16	1.40
	REPLACE BALLASTS-DIRECT		0.0	$0	0.2	$3	$2	$4	$43	1.03	9.75
	POWER FACTOR IMPROVEMENT		0.0	$0	0.0	$0	$11,348	$11,348	$81,204	1.62	7.16
	EXIT LIGHT REPLACEMENT		0.0	$0	632.7	$8,990	$10,600	$19,590	$117,423	1.47	5.99
	LOWER DHW TEMPERATURE		3,565.1	$13,547	106.2	$1,510	$0	$15,057	$3,681	51.50	0.24
F HOUSING	LOWER DHW TEMPERATURE		4,191.7	$15,928	0.0	$0	$0	$15,928	$9,325	22.28	0.59
	NIGHT SETBACK		2,638.8	$10,027	0.0	$0	$0	$10,027	$114,956	1.14	11.46
	REDUCE INFILTRATION		921.0	$3,500	921.0	$13,087	$0	$16,587	$88,781	1.77	5.35
	FLOW RESTRICTORS		2,925.1	$11,115	0.0	$0	$0	$11,115	$100,160	1.45	9.01
1	EFFICIENT LIGHTING SOURCE	1	0.0	$0	0.9	$13	$2	$14	$70	1.76	4.88
	WATER HEATER INSULATION	1									
	CONTRACT		0.1	$1	0.0	$0	$0	$1	$27	0.18	50.92
	SELF-HELP		0.1	$1	0.0	$0	$0	$1	$13	0.38	23.91
2	EFFICIENT LIGHTING SOURCE	15	0.0	$0	32.0	$454	$82	$536	$1,050	4.39	1.96
	WATER HEATER INSULATION	15									
	CONTRACT		1.2	$5	0.0	$0	$0	$5	$406	0.09	89.11
	SELF-HELP		1.2	$5	0.0	$0	$0	$5	$191	0.20	41.84
17	EFFICIENT LIGHTING SOURCE	3	0.0	$0	2.7	$38	$5	$43	$210	1.76	4.88
	WATER HEATER INSULATION	3									
	CONTRACT		0.6	$2	0.0	$0	$0	$2	$81	0.24	37.52
	SELF-HELP		0.6	$2	0.0	$0	$0	$2	$38	0.52	17.62
20	EFFICIENT LIGHTING SOURCE	1	0.0	$0	2.0	$28	($1)	$28	$70	3.34	2.54
21	EFFICIENT LIGHTING SOURCE	4	0.0	$0	10.0	$142	($18)	$124	$840	1.25	6.75
	WATER HEATER INSULATION	4									
	CONTRACT		0.8	$3	0.0	$0	$0	$3	$108	0.24	37.52
	SELF-HELP		0.8	$3	0.0	$0	$0	$3	$51	0.50	17.62
25	EFFICIENT LIGHTING SOURCE	6	0.0	$0	6.9	$98	$30	$128	$840	1.32	6.57

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25	WATER HEATER INSULATION	6									
	CONTRACT		2.8	$11	0.0	$0	$0	$11	$325	0.29	30.34
	SELF-HELP		2.8	$11	0.0	$0	$0	$11	$153	0.62	14.24
57	REDUCE OUTSIDE AIR		27.9	$106	0.0	$0	$0	$106	$2,208	0.63	20.81
63	REDUCE OUTSIDE AIR		329.3	$1,251	0.0	$0		$1,251	$2,771	5.89	2.21
67	REDUCE OUTSIDE AIR		44.5	$169	0.0	$0	$0	$169	$993	2.22	5.88
81	EFFICIENT LIGHTING SOURCE	10	0.0	$0	8.9	$126	$17	$144	$700	1.76	4.88
	WATER HEATER INSULATION	10									
	CONTRACT		1.5	$6	0.0	$0	$0	$6	$271	0.18	47.53
	SELF-HELP		1.5	$6	0.0	$0	$0	$6	$127	0.39	22.32
82	EFFICIENT LIGHTING SOURCE	6	0.0	$0	9.1	$129	$42	$171	$420	3.52	2.46
	WATER HEATER INSULATION	6									
	CONTRACT		1.8	$7	0.0	$0	$0	$7	$163	0.37	23.76
	SELF-HELP		1.8	$7	0.0	$0	$0	$7	$76	0.79	11.16
102	EFFICIENT LIGHTING SOURCE	6	0.0	$0	9.1	$129	$42	$171	$420	3.52	2.46
	WATER HEATER INSULATION	6									
	CONTRACT		1.8	$7	0.0	$0	$0	$7	$163	0.38	23.76
	SELF-HELP		1.8	$7	0.0	$0	$0	$7	$76	0.80	11.16
130	CEILING FANS		329.0	$1,250	0.0	$0	$0	$1,250	$2,197	7.42	1.76
141	REDUCE OUTSIDE AIR		680.4	$2,586	0.0	$0		$2,586	$12,008	2.81	4.64
161	REDUCE OUTSIDE AIR		19.5	$74	0.0	$0	$0	$74	$534	1.82	7.18
	STEAM ISOLATION VALVE		135.3	$514	0.0	$0	$0	$514	$2,552	2.63	4.96
162	REDUCE OUTSIDE AIR		70.1	$266	0.0	$0	$0	$266	$1,040	3.34	3.91
163	REDUCE OUTSIDE AIR		51.7	$196	0.0	$0	$0	$196	$681	3.76	3.47
215	WALL INSULATION		528.4	$2,008	55.1	$782	$0	$2,790	$45,516	0.72	16.31
	HEAT RECOVERY-DUST COLLECTOR		54.4	$207	0.0	$0	$0	$207	$8,359	0.32	40.44
	SPRAY PAINT BOOTH HEAT RECOVERY		87.0	$331	0.0	$0	$0	$331	$41,011	0.11	124.05
	SOLAR WATER HEATER		33.5	$127	0.0	$0	$0	$127	$15,888	0.10	124.81
229	WINDOW INSULATION		33.0	$125	7.8	$110	$0	$236	$4,704	0.55	19.94
234	CEILING FANS		28.0	$106	0.0	$0	$0	$106	$1,090	1.27	10.24
	WINDOW INSULATION		75.2	$286	0.0	$0	$0	$286	$12,514	0.30	43.80
236	SPRAY PAINT BOOTH HEAT RECOVERY		87.0	$331	0.0	$0	$0	$331	$41,011	0.11	124.05

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241 B	INSULATE AND DROP CEILING	95.6	$363	0.0	$0	$0	$363	$17,685	0.27	48.70
241 C	INSULATE AND DROP CEILING	141.6	$538	0.0	$0	$0	$538	$32,455	0.22	60.32
256	WINDOW INSULATION	49.9	$190	0.0	$0	$0	$190	$6,718	0.37	35.41
338	CEILING FANS	124.0	$471	0.0	$0	$0	$471	$1,645	3.74	3.49
	SPRAY PAINT BOOTH HEAT RECOVERY	87.0	$331	0.0	$0	$0	$331	$41,011	0.11	124.05
500	REDUCE OUTSIDE AIR	192.4	$731	0.0	$0	$0	$731	$2,136	4.47	2.92
502	REDUCE OUTSIDE AIR	99.8	$379	0.0	$0	$0	$379	$856	5.78	2.26
503	REDUCE OUTSIDE AIR	46.2	$176	0.0	$0	$0	$176	$1,033	2.22	5.88
504	REDUCE OUTSIDE AIR	99.8	$379	0.0	$0	$0	$379	$396	12.49	1.04
505	REDUCE OUTSIDE AIR	115.8	$440	0.0	$0	$0	$440	$589	9.74	1.34
1012	POOL COVER	514.0	$1,953	0.0	$0	$0	$1,953	$5,120	4.98	2.62
	CEILING FANS	50.0	$190	0.0	$0	$0	$190	$2,197	1.13	11.56
	WINDOW INSULATION	117.9	$448	24.8	$353	$0	$800	$15,024	0.59	18.77
	SOLAR WATER HEATER	616.6	$2,343	0.0	$0	$0	$2,343	$138,946	0.22	59.30
	SOLAR HTG FOR SWIMMING POOL-60C	530.0	$2,014	0.0	$0	$0	$2,014	$74,939	0.35	37.21
	SOLAR HTG FOR SWIMMING POOL-100C	861.0	$3,272	0.0	$0	$0	$3,272	$124,343	0.34	38.00
1020	REDUCE OUTSIDE AIR	57.0	$217	0.0	$0	$0	$217	$1,546	1.83	7.13
1021	REDUCE OUTSIDE AIR	57.0	$217	0.0	$0	$0	$217	$1,546	1.83	7.13
1023	REDUCE OUTSIDE AIR	57.0	$217	0.0	$0	$0	$217	$1,546	1.83	7.13
1060	REDUCE OUTSIDE AIR	6.8	$26	0.0	$0	$0	$26	$2,060	0.16	80.29
1081	REDUCE OUTSIDE AIR	759.3	$2,885	0.0	$0	$0	$2,885	$2,494	15.09	0.86
1601	REDUCE OUTSIDE AIR	869.4	$3,304	0.0	$0	$0	$3,304	$8,423	5.12	2.55
	SOLAR WATER HEATER	1,076.2	$4,090	0.0	$0	$0	$4,090	$304,649	0.18	74.49
1602	REDUCE OUTSIDE AIR	869.4	$3,304	0.0	$0	$0	$3,304	$8,423	5.12	2.55
	SOLAR WATER HEATER	754.4	$2,867	0.0	$0	$0	$2,867	$274,091	0.14	95.61
1800	SPRAY PAINT BOOTH HEAT RECOVERY	87.0	$331	0.0	$0	$0	$331	$41,011	0.11	124.05
1801	REDUCE OUTSIDE AIR	2,128.0	$8,086	0.0	$0	$0	$8,086	$8,423	12.52	1.04

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1802	REDUCE OUTSIDE AIR	2,128.0	$8,086	0.0	$0	$0	$8,086	$8,423	12.52	1.04
1881	REDUCE OUTSIDE AIR	307.7	$1,169	0.0	$0	$0	$1,169	$2,429	6.28	2.08
1965	REDUCE OUTSIDE AIR	112.2	$426	0.0	$0	$0	$426	$1,584	3.51	3.71
2041	COOLING TOWER IMPROVEMENT	0.0	$0	(644.2)	($9,154)	$77,325	$68,171	$43,739	14.25	0.64
	REDUCE OUTSIDE AIR	7.2	$27	0.0	$0	$0	$27	$1,216	0.29	44.55
2102	REDUCE OUTSIDE AIR	29.9	$114	0.0	$0	$0	$114	$322	4.60	2.83
2203	WINDOW INSULATION	70.3	$267	12.8	$181	$0	$448	$7,733	0.65	17.25
2220	REDUCE OUTSIDE AIR	69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2221	REDUCE OUTSIDE AIR	69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2223	REDUCE OUTSIDE AIR	69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2224	REDUCE OUTSIDE AIR	69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2225	REDUCE OUTSIDE AIR	69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2227	REDUCE OUTSIDE AIR	69.4	$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2275	REDUCE OUTSIDE AIR	329.0	$1,250	0.0	$0	$0	$1,250	$3,775	4.32	3.02
2276	REDUCE OUTSIDE AIR	329.0	$1,250	0.0	$0	$0	$1,250	$3,775	4.32	3.02
2291	REDUCE OUTSIDE AIR	130.9	$497	0.0	$0	$0	$497	$856	7.59	1.72
2293	REDUCE OUTSIDE AIR	8.6	$33	0.0	$0	$0	$33	$451	0.94	13.83
3130	WALL INSULATION	1,785.5	$6,785	141.4	$2,009	$0	$8,794	$116,896	0.90	13.29
	WALL INS AND NEW WINDOWS	2,944.0	$11,187	659.0	$9,364	$0	$20,552	$350,467	0.64	17.05
3131	REDUCE OUTSIDE AIR	440.5	$1,674	0.0	$0	$0	$1,674	$9,478	2.30	5.66
	WALL INSULATION	1,357.1	$5,157	141.4	$2,009	$0	$7,166	$116,896	0.72	16.31
	WALL INS AND NEW WINDOWS	2,301.0	$8,744	659.0	$9,364	$0	$18,108	$350,467	0.55	19.35
3135	REDUCE OUTSIDE AIR	242.4	$921	0.0	$0	$0	$921	$3,295	3.65	3.58
3138	WINDOW INSULATION	30.7	$117	0.0	$0	$0	$117	$4,137	0.37	35.42
3165	REDUCE OUTSIDE AIR	135.2	$514	0.0	$0	$0	$514	$506	13.25	0.98
	WINDOW INSULATION	3.2	$12	0.0	$0	$0	$12	$391	0.41	31.95

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3170	WINDOW INSULATION		28.9	$110	0.0	$0	$0	$110	$2,918	0.49	26.56
	LOAD DOCK AIR CURTAIN		21.9	$83	0.0	$0	$0	$83	$2,990	0.36	35.93
3181	REDUCE OUTSIDE AIR		157.5	$599	0.0	$0	$0	$599	$2,832	2.76	4.73
3182	INSULATE AND DROP CEILING		214.1	$814	58.8	$835	$0	$1,649	$22,481	0.79	13.64
	WALL INSULATION		63.3	$241	6.6	$94	$0	$334	$21,798	0.18	65.23
	WALL INS AND NEW WINDOWS		177.0	$673	54.0	$767	$0	$1,440	$33,475	0.46	23.25
3184	REDUCE OUTSIDE AIR		19.6	$74	0.0	$0	$0	$74	$258	3.77	3.46
3191	REDUCE OUTSIDE AIR		89.7	$341	0.0	$0	$0	$341	$1,242	3.58	3.64
3202	WALL INSULATION	3	16.4	$62	2.7	$38	$0	$100	$13,488	0.08	134.63
	WALL INS AND NEW WINDOWS		309.0	$1,174	72.0	$1,023	$0	$2,197	$30,987	0.78	14.10
3208	WALL INSULATION	8	467.9	$1,778	48.7	$692	$0	$2,470	$39,544	0.72	16.01
	WALL INS AND NEW WINDOWS		1,024.0	$3,891	224.0	$3,183	$0	$7,074	$81,520	0.95	11.52
3212	REDUCE OUTSIDE AIR		279.2	$1,061	0.0	$0	$0	$1,061	$1,657	8.35	1.56
3225	WALL INSULATION	18	2,222.6	$8,446	0.0	$0	$0	$8,446	$191,322	0.58	22.65
	WALL INS AND NEW WINDOWS		3,114.0	$11,833	0.0	$0	$0	$11,833	$390,636	0.40	33.01
3232	WALL INSULATION		123.0	$467	0.0	$0	$0	$467	$10,605	0.57	22.70
	PASSIVE SOLAR SUNSPACE		66.5	$253	0.0	$0	$0	$253	$9,570	0.34	37.87
	SOLAR WATER HEATER		59.7	$227	0.0	$0	$0	$227	$22,926	0.13	101.06
	WALL INS AND NEW WINDOWS		295.0	$1,121	0.0	$0	$0	$1,121	$21,678	0.67	19.34
3250	WALL INSULATION		101.8	$387	10.6	$151	$0	$538	$8,765	0.72	16.30
	WALL INS AND NEW WINDOWS		55.0	$209	44.0	$625	$0	$834	$16,664	0.48	19.98
3251	WALL INSULATION	9	1,050.2	$3,991	109.4	$1,555	$0	$5,546	$90,387	0.72	16.30
	WALL INS AND NEW WINDOWS		1,674.0	$6,361	495.0	$7,034	$0	$13,395	$241,839	0.59	18.05
3278	WALL INSULATION	16	882.9	$3,355	92.0	$1,307	$0	$4,662	$76,272	0.72	16.36
	WALL INS AND NEW WINDOWS		1,440.0	$5,472	432.0	$6,139	$0	$11,611	$180,672	0.68	15.56
3301	EFFICIENT LIGHTING SOURCE	2	0.0	$0	3.5	$50	$7	$57	$238	2.06	4.17
	WATER HEATER INSULATION	2									
	CONTRACT		1.2	$5	0.0	$0	$0	$5	$108	0.39	23.00
	SELF-HELP		1.2	$5	0.0	$0	$0	$5	$51	0.83	10.80
3310	EFFICIENT LIGHTING SOURCE	19	0.0	$0	33.6	$478	$65	$543	$2,660	1.75	4.90
	WATER HEATER INSULATION	19									
	CONTRACT		7.6	$29	0.0	$0	$0	$29	$1,029	0.25	35.64
	SELF-HELP		7.6	$29	0.0	$0	$0	$29	$483	0.54	16.74

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3400	EFFICIENT LIGHTING SOURCE	5	0.0	$0	10.7	$151	$27	$179	$350	4.39	1.96
3402	EFFICIENT LIGHTING SOURCE	7	0.0	$0	12.4	$176	$24	$200	$980	1.75	4.90
3500	EFFICIENT LIGHTING SOURCE	6	0.0	$0	36.1	$513	$168	$682	$1,680	3.51	2.46
	WATER HEATER INSULATION	6									
	CONTRACT		4.8	$18	0.0	$0	$0	$18	$650	0.25	35.64
	SELF-HELP		4.8	$18	0.0	$0	$0	$18	$305	0.53	16.74
3501	EFFICIENT LIGHTING SOURCE	5	0.0	$0	11.5	$163	$70	$233	$700	2.89	3.01
	WATER HEATER INSULATION	5									
	CONTRACT		2.5	$9	0.0	$0	$0	$9	$271	0.30	29.10
	SELF-HELP		2.5	$9	0.0	$0	$0	$9	$127	0.65	13.66
3502	EFFICIENT LIGHTING SOURCE	12	0.0	$0	108.0	$1,535	$505	$2,040	$5,039	3.50	2.47
	WATER HEATER INSULATION	12									
	CONTRACT		17.0	$65	0.0	$0	$0	$65	$1,950	0.30	30.12
	SELF-HELP		17.0	$65	0.0	$0	$0	$65	$916	0.63	14.14
3504	EFFICIENT LIGHTING SOURCE	7	0.0	$0	29.8	$424	$76	$500	$980	4.39	1.96
	WATER HEATER INSULATION	7									
	CONTRACT		3.6	$14	0.0	$0	$0	$14	$379	0.32	27.96
	SELF-HELP		3.6	$14	0.0	$0	$0	$14	$178	0.68	13.13
3505	EFFICIENT LIGHTING SOURCE	5	0.0	$0	15.0	$213	$70	$283	$700	3.50	2.47
	WATER HEATER INSULATION	5									
	CONTRACT		3.1	$12	0.0	$0	$0	$12	$271	0.39	23.00
	SELF-HELP		3.1	$12	0.0	$0	$0	$12	$127	0.83	10.80
3531	EFFICIENT LIGHTING SOURCE	2	0.0	$0	15.1	$214	$70	$284	$700	3.51	2.46
	WATER HEATER INSULATION	2									
	CONTRACT		1.7	$6	0.0	$0	$0	$6	$271	0.21	42.95
	SELF-HELP		1.7	$6	0.0	$0	$0	$6	$127	0.44	20.16
3532	EFFICIENT LIGHTING SOURCE	1	0.0	$0	2.3	$33	$10	$43	$280	1.31	6.59
	WATER HEATER INSULATION	1									
	CONTRACT		0.6	$2	0.0	$0	$0	$2	$108	0.19	47.53
	SELF-HELP		0.6	$2	0.0	$0	$0	$2	$51	0.40	22.32
3610	EFFICIENT LIGHTING SOURCE	50	0.0	$0	88.5	$1,258	$171	$1,429	$6,999	1.75	4.90
	WATER HEATER INSULATION	50									
	CONTRACT		20.0	$76	0.0	$0	$0	$76	$2,709	0.25	35.64
	SELF-HELP		20.0	$76	0.0	$0	$0	$76	$1,272	0.54	16.74

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3661	EFFICIENT LIGHTING SOURCE	1	0.0	$0	1.2	$16	$5	$21	$140	1.32	6.57
	WATER HEATER INSULATION	1									
	CONTRACT		0.5	$2	0.0	$0	$0	$2	$54	0.29	30.34
	SELF-HELP		0.5	$2	0.0	$0	$0	$2	$25	0.62	14.24
3700	EFFICIENT LIGHTING SOURCE	4	0.0	$0	18.3	$260	$80	$340	$2,240	1.31	6.59
	WATER HEATER INSULATION	4									
	CONTRACT		6.1	$23	0.0	$0	$0	$23	$867	0.24	37.28
	SELF-HELP		6.1	$23	0.0	$0	$0	$23	$407	0.51	17.50
3706	EFFICIENT LIGHTING SOURCE	6	0.0	$0	13.7	$195	$30	$225	$1,680	1.15	7.46
	WATER HEATER INSULATION	6									
	CONTRACT		4.4	$17	0.0	$0	$0	$17	$650	0.23	38.53
	SELF-HELP		4.4	$17	0.0	$0	$0	$17	$305	0.49	18.09
3719	EFFICIENT LIGHTING SOURCE	7	0.0	$0	32.1	$456	$140	$595	$3,919	1.31	6.59
3719	WATER HEATER INSULATION	7									
	CONTRACT		16.5	$63	0.0	$0	$0	$63	$1,517	0.37	24.27
	SELF-HELP		16.5	$63	0.0	$0	$0	$63	$712	0.78	11.40
3720	EFFICIENT LIGHTING SOURCE	6	0.0	$0	13.7	$195	$60	$255	$1,680	1.31	6.59
	WATER HEATER INSULATION	6									
	CONTRACT		5.3	$20	0.0	$0	$0	$20	$650	0.28	32.04
	SELF-HELP		5.3	$20	0.0	$0	$0	$20	$305	0.59	15.04
3737	EFFICIENT LIGHTING SOURCE	30	0.0	$0	34.2	$486	$149	$635	$3,577	1.54	5.63
	WATER HEATER INSULATION	30									
	CONTRACT		0.3	$1	0.0	$0	$0	$1	$54	0.18	47.53
	SELF-HELP		0.3	$1	0.0	$0	$0	$1	$25	0.39	22.32

EXECUTIVE SUMMARY
ATTACHMENT D

PROJECTS DEVELOPED

PROJECTS DEVELOPED
GROUP #1

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
67	REDUCE OUTSIDE AIR	44.5		$169	0.0	$0	$0	$169	$993	2.22	5.88
141	REDUCE OUTSIDE AIR	680.4		$2,586	0.0	$0		$2,586	$12,008	2.81	4.64
161	REDUCE OUTSIDE AIR	19.5		$74	0.0	$0	$0	$74	$534	1.82	7.18
503	REDUCE OUTSIDE AIR	46.2		$176	0.0	$0	$0	$176	$1,033	2.22	5.88
1020	REDUCE OUTSIDE AIR	57.0		$217	0.0	$0	$0	$217	$1,546	1.83	7.13
1021	REDUCE OUTSIDE AIR	57.0		$217	0.0	$0	$0	$217	$1,546	1.83	7.13
1023	REDUCE OUTSIDE AIR	57.0		$217	0.0	$0	$0	$217	$1,546	1.83	7.13
1801	REDUCE OUTSIDE AIR	2,128.0		$8,086	0.0	$0	$0	$8,086	$8,423	12.52	1.04
1802	REDUCE OUTSIDE AIR	2,128.0		$8,086	0.0	$0	$0	$8,086	$8,423	12.52	1.04
2220	REDUCE OUTSIDE AIR	69.4		$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2221	REDUCE OUTSIDE AIR	69.4		$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2223	REDUCE OUTSIDE AIR	69.4		$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2224	REDUCE OUTSIDE AIR	69.4		$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2225	REDUCE OUTSIDE AIR	69.4		$264	0.0	$0	$0	$264	$1,288	2.67	4.88
2227	REDUCE OUTSIDE AIR	69.4		$264	0.0	$0	$0	$264	$1,288	2.67	4.88
3131	REDUCE OUTSIDE AIR	440.5		$1,674	0.0	$0	$0	$1,674	$9,478	2.30	5.66
3181	REDUCE OUTSIDE AIR	157.5		$599	0.0	$0	$0	$599	$2,832	2.76	4.73
F HOUSING	REDUCE INFILTRATION	921.0		$3,500	921.0	$13,087	$0	$16,587	$88,781	1.77	5.35
TOTALS		7,153.1		$27,182	921.0	$13,087	$0	$40,269	$144,869	3.22	3.60

PROJECTS DEVELOPED
GROUP #2

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
2041	COOLING TOWER IMPROVEMENT	0.0		$0	(644.2)	($9,154)	$77,325	$68,171	$43,739	14.25	0.64
F HOUSING	NIGHT SETBACK	2,638.8	$10,027		0.0	$0	$0	$10,027	$114,956	1.14	11.46
	TOTALS	2,638.8	$10,027		(644.2)	($9,154)	$77,325	$78,198	$158,695	4.75	2.03

PROJECTS DEVELOPED
GROUP #3

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
BASEWIDE	POWER FACTOR IMPROVEMENT		0.0	$0	0.0	$0	$11,348	$11,348	$81,204	1.62	7.16
1	REPLACE KITCHEN LIGHTS	1	0.0	$0	0.9	$13	$2	$14	$70	1.76	4.88
2	REPLACE KITCHEN LIGHTS	15	0.0	$0	32.0	$454	$82	$536	$1,050	4.39	1.96
17	REPLACE KITCHEN LIGHTS	3	0.0	$0	2.7	$38	$5	$43	$210	1.76	4.88
20	REPLACE KITCHEN LIGHTS	1	0.0	$0	2.0	$28	($1)	$28	$70	3.34	2.54
21	REPLACE KITCHEN LIGHTS	4	0.0	$0	10.0	$142	($18)	$124	$840	1.25	6.75
25	REPLACE KITCHEN LIGHTS	6	0.0	$0	6.9	$98	$30	$128	$840	1.32	6.57
63	REDUCE OUTSIDE AIR		329.3	$1,251	0.0	$0		$1,251	$2,771	5.89	2.21
81	REPLACE KITCHEN LIGHTS	10	0.0	$0	8.9	$126	$17	$144	$700	1.76	4.88
82	REPLACE KITCHEN LIGHTS	6	0.0	$0	9.1	$129	$42	$171	$420	3.52	2.46
102	REPLACE KITCHEN LIGHTS	6	0.0	$0	9.1	$129	$42	$171	$420	3.52	2.46
130	CEILING FANS		329.0	$1,250	0.0	$0	$0	$1,250	$2,197	7.42	1.76
162	REDUCE OUTSIDE AIR		70.1	$266	0.0	$0	$0	$266	$1,040	3.34	3.91
163	REDUCE OUTSIDE AIR		51.7	$196	0.0	$0	$0	$196	$681	3.76	3.47
234	CEILING FANS		28.0	$106	0.0	$0	$0	$106	$1,090	1.27	10.24
338	CEILING FANS		124.0	$471	0.0	$0	$0	$471	$1,645	3.74	3.49
500	REDUCE OUTSIDE AIR		192.4	$731	0.0	$0	$0	$731	$2,136	4.47	2.92
502	REDUCE OUTSIDE AIR		99.8	$379	0.0	$0	$0	$379	$856	5.78	2.26
504	REDUCE OUTSIDE AIR		99.8	$379	0.0	$0	$0	$379	$396	12.49	1.04
505	REDUCE OUTSIDE AIR		115.8	$440	0.0	$0	$0	$440	$589	9.74	1.34
1012	CEILING FANS		50.0	$190	0.0	$0	$0	$190	$2,197	1.13	11.56
1012	POOL COVER		514.0	$1,953	0.0	$0	$0	$1,953	$5,120	4.98	2.62
1081	REDUCE OUTSIDE AIR		759.3	$2,885	0.0	$0	$0	$2,885	$2,494	15.09	0.86
1601	REDUCE OUTSIDE AIR		869.4	$3,304	0.0	$0	$0	$3,304	$8,423	5.12	2.55
1602	REDUCE OUTSIDE AIR		869.4	$3,304	0.0	$0	$0	$3,304	$8,423	5.12	2.55
1881	REDUCE OUTSIDE AIR		307.7	$1,169	0.0	$0	$0	$1,169	$2,429	6.28	2.08
1965	REDUCE OUTSIDE AIR		112.2	$426	0.0	$0	$0	$426	$1,584	3.51	3.71
2102	REDUCE OUTSIDE AIR		29.9	$114	0.0	$0	$0	$114	$322	4.60	2.83
2275	REDUCE OUTSIDE AIR		329.0	$1,250	0.0	$0	$0	$1,250	$3,775	4.32	3.02
2276	REDUCE OUTSIDE AIR		329.0	$1,250	0.0	$0	$0	$1,250	$3,775	4.32	3.02
2291	REDUCE OUTSIDE AIR		130.9	$497	0.0	$0	$0	$497	$856	7.59	1.72
3135	REDUCE OUTSIDE AIR		242.4	$921	0.0	$0	$0	$921	$3,295	3.65	3.58
3165	REDUCE OUTSIDE AIR		135.2	$514	0.0	$0	$0	$514	$506	13.25	0.98
3184	REDUCE OUTSIDE AIR		19.6	$74	0.0	$0	$0	$74	$258	3.77	3.46
3191	REDUCE OUTSIDE AIR		89.7	$341	0.0	$0	$0	$341	$1,242	3.58	3.64
3212	REDUCE OUTSIDE AIR		279.2	$1,061	0.0	$0	$0	$1,061	$1,657	8.35	1.56
3301	REPLACE KITCHEN LIGHTS	2	0.0	$0	3.5	$50	$7	$57	$238	2.06	4.17
3310	REPLACE KITCHEN LIGHTS	19	0.0	$0	33.6	$478	$65	$543	$2,660	1.75	4.90
3400	REPLACE KITCHEN LIGHTS	5	0.0	$0	10.7	$151	$27	$179	$350	4.39	1.96
3402	REPLACE KITCHEN LIGHTS	7	0.0	$0	12.4	$176	$24	$200	$980	1.75	4.90
3500	REPLACE KITCHEN LIGHTS	6	0.0	$0	36.1	$513	$168	$682	$1,680	3.51	2.46
3501	REPLACE KITCHEN LIGHTS	5	0.0	$0	11.5	$163	$70	$233	$700	2.89	3.01

PROJECTS DEVELOPED
GROUP #3

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
3502	REPLACE KITCHEN LIGHTS	12	0.0	$0	108.0	$1,535	$505	$2,040	$5,039	3.50	2.47
3504	REPLACE KITCHEN LIGHTS	7	0.0	$0	29.8	$424	$76	$500	$980	4.39	1.96
3505	REPLACE KITCHEN LIGHTS	5	0.0	$0	15.0	$213	$70	$283	$700	3.50	2.47
3531	REPLACE KITCHEN LIGHTS	2	0.0	$0	15.1	$214	$70	$284	$700	3.51	2.46
3532	REPLACE KITCHEN LIGHTS	1	0.0	$0	2.3	$33	$10	$43	$280	1.31	6.59
3610	REPLACE KITCHEN LIGHTS	50	0.0	$0	88.5	$1,258	$171	$1,429	$6,999	1.75	4.90
3661	REPLACE KITCHEN LIGHTS	1	0.0	$0	1.2	$16	$5	$21	$140	1.32	6.57
3700	REPLACE KITCHEN LIGHTS	4	0.0	$0	18.3	$260	$80	$340	$2,240	1.31	6.59
3706	REPLACE KITCHEN LIGHTS	6	0.0	$0	13.7	$195	$30	$225	$1,680	1.15	7.46
3719	REPLACE KITCHEN LIGHTS	7	0.0	$0	32.1	$456	$140	$595	$3,919	1.31	6.59
3720	REPLACE KITCHEN LIGHTS	6	0.0	$0	13.7	$195	$60	$255	$1,680	1.31	6.59
3737	REPLACE KITCHEN LIGHTS	30	0.0	$0	34.2	$486	$149	$635	$3,577	1.54	5.63
TOTALS			6,506.7	$24,725	561.1	$7,973	$13,277	$45,976	$180,120	2.84	3.92

PROJECTS DEVELOPED
GROUP #4

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
BASEWIDE	LOWER DHW TEMPERATURE	3,565.1	$13,547	106.2	$1,510	$0	$15,057	$3,681	51.50	0.24
BASEWIDE	STEAM TRAP REPAIR	6,408.3	$24,352	0.0	$0	$0	$24,352	$6,494	33.41	0.27
161	STEAM ISOLATION VALVE	135.3	$514	0.0	$0	$0	$514	$2,552	2.63	4.96
F HOUSING	FLOW RESTRICTORS	2,925.1	$11,115	0.0	$0	$0	$11,115	$100,160	1.45	9.01
BARRACKS	FLOW RESTRICTORS	3,714.2	$14,114	0.0	$0	$0	$14,114	$60,116	3.06	4.26
TOTALS		16,748.0	$63,642	106.2	$1,510	$0	$65,152	$173,003	4.87	2.66

PROJECTS DEVELOPED
GROUP #5

BUILDING NUMBER	ECO DESCRIPTION	TYPICAL BUILDING QUANTITY	GAS SAVINGS MBTUS	GAS SAVINGS	ELEC SAVINGS MBTUS	ELEC SAVINGS	NON ENERGY SAVINGS	TOTAL COST SAVINGS	CONSTRUCTION COST	SIR	SIMPLE PAYBACK
F HOUSING	LOWER DHW TEMPERATURE	4,191.7	$15,928	0.0	$0	$0	$15,928	$9,325	22.28	0.59
BASEWIDE	EXIT LIGHT REPLACEMENT	0.0	$0	632.7	$8,990	$10,600	$19,590	$117,423	1.47	5.99
TOTALS		4,191.7	$15,928	632.7	$8,990	$10,600	$35,518	$126,748	3.00	3.57